Industry Recognized Credential Transfer Assurance Guide: Programmable Logic Controllers

(Siemens SCE Certificate in Automation and Certificate in Advanced Automation;
Rockwell Automation Studio 5000 Logix Programming Certificate; Mitsubishi Electric PLC & HMI)

October 31, 2022

Industry Recognized Credential Transfer Assurance Guides (ITAGs) are a statewide transfer initiative that guarantees the award of college-level credit to students earning agreed-upon, industry recognized credentials. Students meeting credentialing requirements, regardless of where the learning was achieved, will be eligible to earn credit for specified courses deemed equivalent to the stated industry recognized credential listed on the ITAG document. Credentials are reviewed and aligned to postsecondary learning outcomes that are endorsed by Ohio's public institutions of higher education. The receiving institution must offer an equivalent course or program. Additional information on accessing and awarding ITAG credit is outlined in this document.

Required Credential(s)

Credential Names: Students who hold any **one** of the following credentials or pair of credentials are eligible for ITAG credit:
1. Siemens SCE Certificate in Automation and Certificate in Advanced Automation: The student most hold both of these credentials to be eligible for ITAG credit.
2. Rockwell Automation Studio 5000 Logix Programmer Certificate
3. Mitsubishi Electric PLC & HMI

Credential Issuer: Siemens; Rockwell Automation; Mitsubishi

Exams:
Siemens SCE Certificate in Automation and Certificate in Advanced Automation: SCE Automation Fundamentals Certification Test for Students: PLC (all 3 parts) and SCE Advanced Automation Fundamentals Certification Test for Students: PLC (all 5 parts)
Rockwell Automation Studio 5000 Logix Programming Certificate: Logix Programmer Assessment (upon completion of the 4 courses in the curriculum)
Mitsubishi Electric PLC & HMI

Credit Access and Verification

Student: Students requesting credit for Siemens credentials may share information digitally using Credly at https://www.credly.com/organizations/siemens/badges.

Students requesting credit for Rockwell Automation credentials may request that a copy of their certificate be sent to the receiving institution using the following email address: trainingservices@ra.rockwell.com

Students requesting credit for Mitsubishi Electric credentials may request that a copy of their certificate be sent to the receiving institution using the following email address: info@meaa-mea.com

Institution: Students requesting credit will share information digitally through Credly or request a certificate to be sent from the issuer.

Course Information

Course Name: ITEET022 – Programmable Logic Controllers (OET022)
Credit Hours: 3
Course Description: This course includes the principles and application of Programmable Logic Controllers including ladder logic, program control, data manipulation, math instructions, sequencers, shift registers, networking, PLC-mechanism interfacing and human-machine interfacing. Students will install, program, and document PLCs used in a variety of applications. The course will include advanced control circuits, advanced design of ladder and wiring diagrams to meet a given set of criteria, PLC programming, development of a human-machine interface, and data transfer in PLC networks. Must include hands-on labs.

Learning Outcomes and Credential Alignment

Proposed Alignment of Siemens SCE Certificates in Automation and Advanced Automation, Rockwell Automation Studio 5000 Logix Programmer Certificate, and Mitsubishi Electric PLC & HMI to Postsecondary Learning Outcomes

Postsecondary Learning Outcomes *(Copy of OET022)*	Credential Content: Siemens SCE Certificate in Automation and Certificate in Advanced Automation	Credential Content: Rockwell Automation Studio 5000 Logix Programmer Certificate	Credential Content: Mitsubishi Electric PLC & HMI
1. Recall the history of control systems and programmable logic controllers (PLCs).*	Identify the major components of a PLC and describe their functions	Basic Programming	Understand and establish basic knowledge of PLC programming for Mitsubishi PLCs
2. Explain and describe the use of number systems.*	Data types; A to D conversion	Basic Programming	Be able to perform basic PLC operations Become familiar with Mitsubishi PLC software GXWorks2 (how to connect to a plc system directly, via a HMI, via a network). Learn how to create/modify, monitor and save programs. Troubleshoot Mitsubishi PLC's

Postsecondary Learning Outcomes *(Copy of OET022)*	Credential Content: Siemens SCE Certificate in Automation and Certificate in Advanced Automation	Credential Content: Rockwell Automation Studio 5000 Logix Programmer Certificate	Credential Content: Mitsubishi Electric PLC & HMI
3. Demonstrate the use of ladder logic programming devices.*	Read a basic ladder logic diagram and statement list	Basic Programming	Be able to perform basic PLC operations Become familiar with Mitsubishi PLC software GXWorks2 (how to connect to a plc system directly, via a HMI, via a network). Learn how to create/modify, monitor and save programs. Troubleshoot Mitsubishi PLC's
4. Employ ladder logic in control circuit design.*	Read a basic ladder logic diagram and statement list	Basic Programming	Be able to perform basic PLC operations Become familiar with Mitsubishi PLC software GXWorks2 (how to connect to a plc system directly, via a HMI, via a network). Learn how to create/modify, monitor and save programs. Troubleshoot Mitsubishi PLC's
5. Use addressing to control Input/Output (I/O) modules.*	Connect a simple discrete input and output to an S7-200. Select the proper expansion module for analog inputs and outputs	Allen Bradley Structured Text Programming	Understand and establish basic knowledge of PLC programming for Mitsubishi PLCs
6. Demonstrate the use of relays, contacts, coils, and timers.*	Describe the operation of timers and counters	Allen Bradley Sequential Function Chart Programming	Be able to create plc programs using many advanced functions (counters, timers, data registers, mov commands, comparisons, Arithmetic instructions, master control)

Postsecondary Learning Outcomes *(Copy of OET022)*	Credential Content: Siemens SCE Certificate in Automation and Certificate in Advanced Automation	Credential Content: Rockwell Automation Studio 5000 Logix Programmer Certificate	Credential Content: Mitsubishi Electric PLC & HMI
7. Demonstrate counters and sequencers.*	Describe the operation of timers and counters	Allen Bradley Function Block Programming	Be able to create plc programs using many advanced functions (counters, timers, data registers, mov commands, comparisons, Arithmetic instructions, master control)
8. Demonstrate fundamental PLC programming (e.g., comparators, block transfers, I/O forcing).*	Basic network communications between PLCs, HMIs, and distributed IO	Allen Bradley Function Block Programming	Be able to design screens on HMI (push buttons, lights, numerical display and input, templates, simple animation)
9. Demonstrate data transfer in PLC networks.*	Basic network communications between PLCs, HMIs, and distributed IO	Allen Bradley Sequential Function Chart Programming	Be able to connect HMI to PLC (serial, Ethernet, bus)

ITAG Development Panel

Lead name	Institution/Organization	Role
Robert Speckert	Miami University	Lead Panel Member - Faculty
Dr. C. M. Lamb	Youngstown State University	Panel Member – Faculty
Dan Wagner	North Central State College	Panel Member – Faculty
Dr. Ted Evans	University of Toledo	Panel Member – Faculty
Jonathan Alexander	Lorain County Community College	Panel Member – Faculty
Tobin Huebner	Grant Career Center	Panel Member – Career Center/OTC
John Henry	Mitsubishi Electric	Industry
Ritch Ramey	RAMTEC	Industry
Bob Graff	I4.0Strategies,LLC	Industry
Nikki Wearly	Ohio Department of Higher Education	Director, Career-Technical Education Transfer Initiatives
Dr. Ben Parrot	Ohio Department of Higher Education	Senior Associate Director, SCTAI Implementation